Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934	)	WT Docket No. 97-192
	)	
Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation	)	ET Docket No. 93-62
	)	
Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities	)	RM-8577

SECOND MEMORANDUM OPINION AND ORDER
AND
NOTICE OF PROPOSED RULEMAKING

Adopted: August 25, 1997 Released: August 25, 1997

Comment Date (WT Docket No. 97-192): **October 9, 1997**
Reply Comment Date (WT Docket No. 97-192): **October 24, 1997**

By the Commission:

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I. INTRODUCTION

1. By this action, we are adopting a *Second Memorandum Opinion and Order* in ET Docket No. 93-62, responding to petitions and amending certain aspects of our guidelines for evaluating the environmental effects of radiofrequency (RF) emissions produced by FCC-regulated transmitters. We are also adopting a *Notice of Proposed Rulemaking* in WT Docket No. 97-192, opening a new proceeding to establish procedures for filing and reviewing requests for relief from state or local regulations based directly or indirectly on the environmental effects of RF emissions.

II. SECOND MEMORANDUM OPINION AND ORDER

A. Introduction and Executive Summary

2. In this *Second Memorandum Opinion and Order*, we are amending our rules to refine and clarify the decisions adopted in the *Report and Order* in ET Docket No. 93-62 regarding the use of new guidelines and methods in the evaluation of the environmental effects of RF electromagnetic fields or emissions produced by FCC-regulated transmitters. This *Second Memorandum Opinion and Order* responds to petitions for reconsideration and/or clarification filed in this proceeding. In reaching our decisions, we have considered carefully the petitions and comments that were received in this proceeding. We believe our decisions provide a proper balance between the need to protect the public and workers from exposure to potentially harmful RF electromagnetic fields and the requirement that industry be allowed to provide telecommunications services to the public in the most efficient and practical manner possible. Specifically, we are: 1) affirming the RF exposure limits that were previously adopted; 2) modifying in a few areas our policy that categorically excludes certain transmitters from routine environmental evaluation; 3) revising and clarifying our guidelines regarding RF emissions involving multiple transmitter operating at one site; and 4) modifying our rules to extend the initial transition period to October 15, 1997, and to require that all existing facilities be brought into compliance with our new guidelines within three years (by September 1, 2000). We are also adopting a number of minor changes and clarifications.

3. In the *Report and Order*, the Commission adopted limits for Maximum Permissible Exposure (MPE) and localized, partial-body exposure of humans based on criteria published by the National Council on Radiation Protection and Measurements (NCRP) and by the American National Standards Institute/Institute of Electrical and Electronics Engineers, Inc. (ANSI/IEEE). The *Report and Order* also modified the Commission's policy on categorical exclusions that exempts many radio services and transmitters from routine environmental evaluation for RF exposure. In accordance with Section 704 of the Telecommunications Act of 1996, the *Report and Order* followed Congressional direction with respect to completion of the docket in this proceeding. The new rules became effective immediately; however, a transition period (originally to January 1, 1997) was provided for implementation of the new requirements for transmitters other than portable and mobile devices.

4. Several technical and legal issues were raised in the petitions. A *First Memorandum Opinion and Order*, adopted on December 23, 1996, addressed comments in those petitions requesting extension of the transition provisions of the *Report and Order* and extended the transition period to September 1, 1997 (January 1, 1998 for the Amateur Radio Service, only). This *Second Memorandum Opinion and Order* addresses the other issues raised in the petitions, including whether we should: (1) reconsider the RF exposure limits originally adopted; (2) reconsider our policy on categorical exclusion of certain transmitters from routine evaluation for compliance with our guidelines; (3) modify our policy with respect to evaluation of RF exposure at multiple transmitter sites; (4) revise our policy with respect to routine evaluation for SMR transmitters; and (5) broaden our authority to preempt state and local regulations concerning RF exposure.

5. Some petitioners ask that we reconsider our previous decision not to adopt ANSI/IEEE C95.1-1992 in its entirety. Several other petitioners claim that the limits we adopted were not protective enough. The staff believes that no new and compelling justifications have been provided that would warrant a modification of the limits adopted in the *Report and Order*. Those limits were crafted to address concerns about ANSI/IEEE C95.1-1992 that had been raised by several agencies of the Federal Government with responsibility for health and safety. Furthermore, all of these agencies have written letters to the Commission supporting our new guidelines. We believe that the limits adopted in the *Report and Order* provide a proper balance between the need to protect the public and workers from exposure to excessive RF electromagnetic fields and the need to allow communications services to readily address growing marketplace demands.

6. The Commission's environmental rules identify particular categories of existing or proposed transmitters or facilities for which licensees and applicants are required to conduct routine environmental evaluations to determine whether these transmitters or facilities comply with our RF guidelines. Other transmitting facilities are categorically excluded from these rules because we have judged them to offer little potential for causing exposures in excess of the applicable guidelines. In the *Report and Order*, we revised our rules related to this policy of categorical exclusion based on our own calculations and analyses of the implications of the new limits, along with information and data acquired during the proceeding. Whereas previously we had categorically excluded entire service categories, such as paging and cellular transmitters, the *Report and Order* concluded that some transmitting facilities, regardless of service, may offer the potential for causing exposures in excess of MPE limits.

7. Several petitioners ask that we return to our earlier policy of categorical exclusion for entire services. However, these petitioners present no new evidence that would lead us to change our basic premise for categorical exclusion. We continue to believe that it is desirable and appropriate to categorically exclude from routine environmental evaluation only those transmitting facilities that offer little or no potential for exposure in excess of our limits. However, some transmitting facilities, regardless of service, offer the potential for causing exposures in excess of MPE limits because of such factors as their relatively high operating

power, location or relative accessibility, and these facilities should not be categorically excluded from routine evaluation.

8. Except in a few limited areas, we do not believe it is appropriate to modify the categorical exclusion policies adopted in the *Report and Order*. We are modifying our policy related to unlicensed millimeter-wave devices that do not meet the definition of a portable device and unlicensed and licensed PCS and other mobile devices operating above 1.5 GHz. Secondly, we are revising the 50-watt threshold for routine evaluation of amateur radio stations so that it reflects the manner in which the RF exposure limits change in the different amateur frequency bands. We are also revising categorical exclusions currently based on the height of the antenna radiation center above ground so that they are based on the height of the lowest portion of the antenna above ground. In addition to these areas, we are revising our policy on categorical exclusions for SMR transmitters so that all SMR operations are covered, and we are changing our definition of "rooftop" so that antennas that are mounted on the sides of buildings or otherwise don't fit the previous definition will be considered, if appropriate.

9. Several petitioners argue that our policy regarding evaluation at sites with multiple FCC-regulated transmitters is overly burdensome. Our rules state that when the RF exposure limits are exceeded in an accessible area due to the RF fields of multiple fixed transmitters, actions necessary to bring the area into compliance are the shared responsibility of all licensees whose transmitters produce power densities in excess of 1% of the exposure limit applicable to their transmitter. After considering the various arguments, we conclude that the 1% level should be changed. We concur that a 1% level is difficult to measure or calculate. We believe that a 5% threshold represents a more reasonable and supportable compromise, by offering relief to relatively low-powered site occupants who do not contribute significantly to areas of non-compliance and, at the same time, by providing for the appropriate allocation of responsibility among major site emitters.

10. Some petitioners request that the Commission broaden its preemptive authority beyond the category of "personal wireless services" authorized in the Telecommunications Act of 1996. Based upon the current record in this proceeding, we find that there is insufficient evidence at this time to warrant our preempting state and local actions that are based on concerns over RF emissions for services other than those defined by Congress as "personal wireless services." However, additional issues concerning preemption of state and local regulations involving advanced television facilities have been raised in a Petition for Further Rulemaking filed by the National Association of Broadcasters which will be considered in a separate proceeding.

11. Several additional petitions were received in response to our earlier *First Memorandum Opinion and Order* extending the transition period for fixed stations and transmitters. Some petitioners request that we end the transition period immediately because of the potential for large scale exposure of the public to harmful RF emissions. Others argue that additional time is needed to consider the Commission's response to earlier petitions

relating to OET Bulletin 65 on RF compliance. This bulletin will be released simultaneously with this Order. In order to provide applicants and licensees with sufficient time to review the final version of the bulletin, we will extend the initial transition period to October 15, 1997. The transition period for the Amateur Radio Service, only, will remain the same, and will end on January 1, 1998.

12. Finally, we are revising our rules to require that existing sites and transmitters come into compliance with the new guidelines as of a date certain. Accordingly, we will require all existing facilities, operations and devices to comply with the new FCC RF guidelines no later than September 1, 2000.

B. Background

13. The National Environmental Policy Act of 1969 (NEPA) requires agencies of the Federal Government to evaluate the effects of their actions on the quality of the human environment.[1] To meet its responsibilities under NEPA, the Commission has adopted requirements for evaluating the environmental impact of its actions.[2] One of several environmental factors addressed by these requirements is human exposure to RF energy emitted by FCC-regulated transmitters and facilities.

14. The Commission's environmental processing rules, 47 C.F.R. §§ 1.1301-1.1319, generally require an applicant to perform the necessary analysis (e.g., calculations and/or measurements) to ascertain whether a particular transmitting facility or device complies with the Commission's adopted RF exposure guidelines set forth in section 1.1307(b), in effect at the time the applicant files for an initial construction permit, license, or renewal or modification of an existing license. If on the basis of the applicant's analysis the applicant determines that the facility complies (or will comply) with the Commission's adopted RF guidelines, the applicant certifies compliance as part of its application. If, on the other hand, the applicant determines that operation of the facility or device will not comply with the RF guidelines, the applicant is required to prepare an Environmental Assessment, and undergo environmental review by Commission staff unless the applicant amends its application so as to comply with the Commission's adopted RF guidelines. See 47 C.F.R. §§ 1.1311; see also 47 C.F.R. §§1.1308, 1.1309, 1.1314-1.1317.

15. If no pre-construction Commission authorization is required (as is the case for PCS and cellular licenses, for example, where the Commission authorizes blanket licenses that are not site-specific), Section 1.1312 of the Commission's environmental processing rules requires that the licensee conduct the appropriate calculations and determine whether the

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[1] National Environmental Policy Act of 1969, 42 U.S.C. Section 4321, *et seq.*

[2] *See* 47 CFR § 1.1301, *et seq.*

facility will comply with the Commission's adopted RF guidelines in effect at that time (i.e., at the pre-construction, not the initial application, stage) prior to the commencement of construction, rather than prior to licensing under the Commission's general environmental processing scheme. The processing requirements remain the same -- if the calculations indicate compliance with the RF guidelines, the licensee may proceed with construction; if the calculations indicate non-compliance, the licensee will either modify its proposal to ensure compliance or submit an Environmental Assessment and undergo Commission environmental review prior to construction. The only difference lies in the timing: environmental calculations must take place prior to construction rather than prior to the applicable licensing.

16. Finally, it should be noted that if the facility or device has been categorically excluded from environmental processing requirements with respect to the RF exposure guidelines based on the Commission's prior determination that the operation of such facility or device, individually or cumulatively, will not exceed the Commission's adopted RF exposure limits, the applicant or licensee is exempt from the requirement of performing any calculations and/or measurements to determine whether there is compliance; the Commission presumes that the operation of a categorically excluded facility or equipment is in compliance.

17. In 1985, the Commission adopted a 1982 American National Standards Institute (ANSI) standard for use in evaluating the effects of RF electromagnetic fields on the environment, noting that the ANSI standard was widely accepted and was technically and scientifically supportable.[3] In 1992, ANSI adopted a new standard for RF exposure, designated ANSI/IEEE C95.1-1992, to replace its 1982 standard.[4] This new standard contained a number of significant differences from the 1982 ANSI standard and, in some respects, was more restrictive in the amount of environmental RF exposure permitted. On April 8, 1993, the Commission issued the *Notice of Proposed Rule Making* (*Notice*) in this proceeding to consider amending and updating the guidelines and methods used by the Commission for evaluating the environmental effects of RF electromagnetic fields.[5] In the *Notice*, we proposed to base our regulations on the ANSI/IEEE C95.1-1992 standard instead of the 1982 ANSI standard. More than 100 parties, including telecommunications organizations, other Federal Government agencies, state and local authorities, and individuals, submitted comments in response to the *Notice*.

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[3] *See Report and Order*, GEN Docket No. 79-144, 100 FCC 2d 543 (1985); *Memorandum Opinion and Order*, 58 RR 2d 1128 (1985); *see also* ANSI C95.1-1982, "American National Standard Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz," ANSI, New York, NY.

[4] ANSI/IEEE C95.1-1992, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz." This standard had been developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE), in 1991.

[5] *See Notice of Proposed Rule Making*, ET Docket No. 93-62, 8 FCC Rcd 2849 (1993); *see also* 8 FCC Rcd 5528 (1993), 9 FCC Rcd 985 (1993), 9 FCC Rcd 317 (1994), 9 FCC Rcd 989 (1994) extending the comment deadlines.

18. On August 1, 1996, we adopted the *Report and Order* in this proceeding amending our rules to provide for the use of new guidelines and methods in the evaluation of the environmental effects of RF electromagnetic fields produced by FCC-regulated transmitters.[6] Seventeen petitions for reconsideration and/or clarification were filed in response to the *Report and Order*. A list of those organizations and individuals filing petitions, as well as those filing oppositions and replies to the petitions, can be found in Appendix B. Several technical and legal issues have been raised in the petitions. In the *First Memorandum Opinion and Order* in this proceeding, we addressed those petitions, motions, and comments that requested extensions of the transition periods adopted in the *Report and Order*.[7] This *Second Memorandum Opinion and Order* addresses the other issues that were raised in the petitions and comments.

C. Discussion

1. RF Exposure Limits

19. In the *Notice* in this proceeding, we proposed to base our RF exposure guidelines on limits for RF exposure contained in the ANSI/IEEE C95.1-1992 standard. However, comments filed in this proceeding from federal health and safety agencies, notably the U.S. Environmental Protection Agency (EPA) and the U.S. Food and Drug Administration (FDA), raised questions about certain aspects of those limits and recommended against the adoption of the entire ANSI/IEEE C95.1-1992 standard. After careful consideration of those views as well as the views of those commenters who opposed the federal agencies' views, we decided to adopt guidelines and limits that are generally based on elements of the exposure criteria recommended by the National Council on Radiation Protection and Measurements (NCRP) as well as those contained in the ANSI/IEEE C95.1-1992 standard.[8]

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[6] *See Report and Order*, ET Docket 93-62, released August 1, 1996, FCC 96-326, 11 FCC Rcd 15123 (1997).

[7] *See First Memorandum Opinion and Order*, ET Docket 93-62, released December 24, 1996, FCC 96-487, 11 FCC Rcd 17512 (1997).

[8] *See Report and Order*, ET Docket No. 93-62, *supra.*, at paras. 12-34. We adopted Maximum Permissible Exposure (MPE) limits for electric and magnetic field strength and power density for transmitters operating at frequencies from 300 kHz to 100 GHz that are generally based on Sections 17.4.1 and 17.4.2, and the time-averaging provisions recommended in Sections 17.4.1.1 and 17.4.3, of "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86 (1986). With the exception of the limits on exposure to power density above 1500 MHz and the limits for exposure to lower frequency magnetic fields, these MPE limits are also generally based on the guidelines contained in Section 4.1 of ANSI/IEEE C95.1-1992. We also adopted limits for localized ("partial body") absorption for certain portable transmitting devices based on Sections 4.2.1 and 4.2.2 of ANSI/IEEE C95.1-1992 and Section 17.4.5 of NCRP Report No. 86.

20. The Electromagnetic Energy Association (EEA), U S WEST, Inc. and the Department of Defense (DOD) ask us to reconsider our decision not to adopt the ANSI/IEEE 1992 standard in its entirety.[9] The National Association of Broadcasters (NAB) also supports this position in its comments.[10] EEA and U S WEST state that our decision disregarded the preponderance of the technical and scientific evidence in the record. DOD questions our scientific rationale for not adopting the ANSI/IEEE C95.1-1992 standard, stating that ANSI/IEEE C95.1-1992 is a scientifically-based consensus standard that periodically undergoes review and update and that it includes a number of provisions and changes that address shortcomings or limitations in both the 1982 ANSI standard and the NCRP guidelines. DOD and EEA argue that our new guidelines fail to recognize differences between electric and magnetic fields at lower frequencies, do not address induced and contact currents in the body, and provide no guidance for frequencies between 100 GHz and 300 GHz.

21. EEA states that our adoption of a "hybrid" approach based on NCRP exposure guidelines, rather than ANSI/IEEE C95.1-1992, results in the loss of the rationale underlying the standard itself and requires the development of new measurement procedures rather than relying on the ANSI/IEEE recommendations. U S WEST adds that our decision to adopt "a sort of hybrid standard" based on the guidelines recommended by the NCRP and the ANSI/IEEE "was erroneous both as a matter of law and policy", since it ignored "highly credible evidence" provided by academic RF experts, "persuasive evidence" submitted by industry constituents, and "initial endorsement" of ANSI/IEEE C95.1-1992 by several governmental agencies.

22. The DOD and the Hewlett-Packard Company (HP) state that our decision to adopt RF exposure limits that differ significantly from those initially proposed in the *Notice*, without issuing a second Notice of Proposed Rule Making allowing comment, does not appear to conform to Section 553(b) of the Administrative Procedure Act (APA).[11] The American Radio Relay League, Inc. (ARRL) also claims that we violated provisions of the APA in adopting the *Report and Order*.[12] DOD says that our decision was made in "an unnecessarily closed and narrow-focused" process, and denied interested parties with safety and health responsibilities, such as DOD, an opportunity to evaluate a draft decision and present comments. DOD also alleges that our decision did not receive adequate coordination with all federal agencies or departments having responsibility for RF safety and health. The ARRL argues that our *Notice* in this proceeding was faulty in that it failed to identify the nature of

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[9] *See* EEA Petition at 11-14, U S WEST Petition at 1-3, and DOD Petition at 4-8.

[10] NAB Comments on Petitions for Reconsideration at 1.

[11] DOD Petition at 2-3, HP Petition at 3.

[12] ARRL Petition at 5-9.

the rules to be adopted and did not adequately apprise radio amateurs of the obligations that would be placed on them in the *Report and Order*.

23. DOD also claims that our decisions contained in the *Report and Order* jeopardize DOD compliance with the National Technology Transfer and Advancement Act of 1995 (NTTAA), which requires that "Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies ..."[13] DOD states that it is committed to following this law and supports open, voluntary, non-government consensus-based standards unless data are presented to show cause not to do so. DOD argues that the public interest is not served by "conflicting safety guidelines" and that consistency in standards produces confidence and credibility. DOD expresses concern that our decision not to adopt ANSI/IEEE C95.1-1992 will "foster lack of confidence" in the voluntary standards-setting process and reduce the beneficial impact of the NTTAA.

24. DOD also states that our ruling conflicts with new international standards. DOD points out that ANSI/IEEE 1992 standard has been used as the basis for several international safety guidelines, such as the North Atlantic Treaty Organization (NATO) Standardization Agreement (STANAG) 2345. It believes that international harmonization of standards is desirable to encourage the promotion of trade and commercial product development. Since the United States led the update of the ANSI 1992-based NATO standard, DOD claims that the "impact of loss of credibility in that standards setting process would be significant."

25. Several petitioners claim that the guidelines we adopted are not protective enough. The Ad-hoc Association of Parties Concerned About the Federal Communications Commission's Radiofrequency Health and Safety Rules (Ad-hoc Association) claims that there may be potentially adverse health effects at exposure conditions permitted by our rules and, therefore, it is in the public interest to modify the rules.[14] The Ad-hoc Association, David Fichtenberg and Alan Golden all propose that we adopt a policy of keeping exposures "as low as reasonably achievable," with the limits being viewed only as "maximally tolerable limits."[15] Further, the Ad-hoc Association and others oppose the petitions that advocate our endorsement of the ANSI/IEEE C95.1-1992 standard.[16] The Ad-hoc Association also maintains that we erred in not adopting a section of the NCRP report dealing with exposures when the carrier frequency is modulated between 5 and 100 Hz. Finally, the Ad-hoc

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[13] Pub. L. 104-113.

[14] Ad-hoc Association Petition at 3-18.

[15] Ad-hoc Association Petition at 3-18, David Fichtenberg Comments at 1-25, Alan Golden Reply at 5, Dawn Mason Reply at 2.

[16] Ad-hoc Association Reply at 1-2, David Fichtenberg Comments at 1-25, Holly Fournier and Mary Beth Freeman, Reply at 2-3, Alan Golden, Reply at 4-5, Dawn Mason Reply at 2.

Association advocates that we should ask the federal health and safety agencies to evaluate requested modifications in our guidelines.[17]

26. The Cellular Phone Taskforce (Cellular Taskforce) states that our guidelines should be modified to protect individuals who are "electrosensitive."[18] The Cellular Taskforce maintains that such individuals are "hypersensitive" to non-ionizing electromagnetic fields and that "perhaps 2%" of the population is susceptible to becoming electrosensitive. The Cellular Taskforce believes that the allowable limits for power density should be set at 10 microwatts-per-squared-centimeter ($\mu W/cm^2$) for all frequencies above 100 MHz to protect against "non-thermal bioeffects." In a separate petition, Dr. Marjorie Lundquist suggests that the existence of non-thermal effects are controversial, but claims that "the scientific consensus is swinging in favor of their existence."[19] The Cellular Taskforce advocates a limit of 40 milliwatts-per-squared-centimeter (mW/cm^2) for peak power density to protect against "microwave hearing" in the frequency range of 300 to 3000 MHz. Also, the Cellular Taskforce suggests that limits for specific absorption rate (SAR) should be revised to allow for different rates of absorption among members of the public.

27. Dr. Marjorie Lundquist maintains that ANSI/IEEE C95.1-1992 and our guidelines are not consistent with electromagnetic field theory, lack a sound scientific basis and may, therefore, be presumed "to be inadequately protective of public health." According to Dr. Lundquist, there is an "urgent" need for us to take regulatory action with respect to near-field exposure from RF emitters since, she claims, there is increasing evidence of cancer associated with human exposure to these fields. She also states that other health effects, such as hypersensitivity to electromagnetic fields, seem to be a growing problem, at least in certain environments. Dr. Lundquist recommends that we hold a public hearing on the issue of RF exposure standards, since, she maintains, our guidelines fall "so far short of what is needed to provide genuine protection" that the shortcomings need to be made public.

28. In comments filed in opposition, Ameritech Mobile Communications, Inc. and EEA express their disagreement with the views expressed by the Ad-hoc Association, Dr. Marjorie Lundquist, and others regarding the need for more stringent RF exposure limits.[20] Ameritech maintains that standards for RF exposure must be based on scientific data which is thoroughly tested and focused. Ameritech states that there is room for disagreement among experts in the field, but the telecommunications industry "will not be able to function under the approach suggested by the Ad-hoc Association that the Commission assume the worst in the face of any uncertainty." Ameritech notes that billions of dollars are being invested in

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[17] Ad-hoc Association Petition at 4.

[18] Taskforce Petition at 1-8.

[19] Dr. Marjorie Lundquist Petition at 7.

[20] Ameritech Comments at 1-3, EEA Reply at 6-7.

telecommunications infrastructure, and it is no simple matter to modify a telecommunications system as a result of each new study. The EEA notes that the issue of "non-thermal" effects was explicitly addressed in the 1992 ANSI/IEEE standard, which concluded that no reliable scientific data exist to indicate such effects may be "meaningfully related to human health."

29. Decision. We reaffirm our decision to adopt exposure limits for field strength and power density based on recommendations contained in NCRP Report No. 86 and ANSI/IEEE C95.1-1992. We continue to believe that these RF exposure limits provide a proper balance between the need to protect the public and workers from exposure to excessive RF electromagnetic fields and the need to allow communications services to readily address growing marketplace demands.

30. We appreciate the views of some petitioners that we should have adopted all provisions of the ANSI/IEEE C95.1-1992 standard. However, as discussed in our *Report and Order*, although most commenting parties generally supported our proposal to adopt the ANSI/IEEE C95.1-1992 standard, certain agencies of the Federal Government with oversight responsibilities for safety and health objected to the use of certain aspects of this standard.[21] In the past, the Commission has stressed repeatedly that it is not a health and safety agency and would give great weight to the judgment of these expert agencies with respect to determining appropriate levels of safe exposure to RF electromagnetic fields.[22] The guidelines and rules we adopted in the *Report and Order* addressed the concerns raised by the health and safety agencies and, at the same time, contained limits that over a wide frequency range are based on those recommended in the ANSI/IEEE C95.1-1992 standard.

31. As for claims that our guidelines are not protective enough, we reiterate that these guidelines are based on recommendations of expert organizations and federal agencies with responsibilities for health and safety. It would be impracticable for us to independently evaluate the significance of studies purporting to show biological effects, determine if such effects constitute a safety hazard, and then adopt stricter standards that those advocated by federal health and safety agencies. This is especially true for such controversial issues as non-thermal effects and whether certain individuals might be "hypersensitive" or "electrosensitive."

32. Concerning objections that our guidelines are not scientifically-based or technically sound, we note that our guidelines are based on recommendations of both the ANSI/IEEE C95.1-1992 standard and the NCRP exposure criteria. Both of these organizations are

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[21] *See Report and Order* at paras. 15-20.

[22] *See, e.g., Report and Order*, GEN Docket 79-144, 100 FCC 2d 543 (1985), at para. 26 note 6 and *Report and Order*, ET Docket 93-62, *supra.*, at para. 28. *See also*, letter from Mark S. Fowler, Chairman, FCC, to Anne M. Burford, Administrator, EPA, February 22, 1983; letter from Dennis R. Patrick, Chairman, FCC, to Lee M. Thomas, Administrator, EPA, November 29, 1988; and letter from Thomas P. Stanley, Chief Engineer, FCC, to Ken Sexton, Director, Office of Health Research, Office of Research and Development, EPA, October 24, 1990.

internationally recognized for their expertise in this area, and there is little evidence to support a claim that these guidelines are not based on science. In fact, both the ANSI/IEEE and NCRP guidelines are based on the same threshold for potentially hazardous whole-body exposure.[23] We recognize that ongoing research in a number of areas may ultimately result in changes in the fundamental understandings upon which ANSI/IEEE C95.1-1992 and the NCRP Report No. 86 are based. Both the IEEE and the NCRP have committees that are working on revisions of their respective exposure guidelines. As indicated in the *Report and Order*, we encourage these organizations and other similar groups developing exposure criteria to work together, along with the relevant federal agencies, to develop consistent, harmonized guidelines that will address the concerns and issues raised in this proceeding. We will, of course, consider amending our rules at any appropriate time if these groups conclude that such action is desirable.

33. Regarding the criticism from the Ad-hoc Association over our failure to adopt the NCRP's clause related to carrier modulation, we reiterate our previous conclusion that there is insufficient evidence to give special consideration to modulation effects.[24] Since we have no specific indication of exposure hazards related to modulation caused by FCC-regulated transmitters, and since at this time no new proof of such hazards has been presented by petitioners, we continue to believe that it would be premature to adopt the NCRP modulation criteria. However, we will evaluate and consider any new evidence relating to modulation effects this is submitted to us in the future.

34. As for the suggestion made by Dr. Marjorie Lundquist that we convene a public hearing or further consult with federal health and safety agencies, we note that we have considered carefully well over 150 sets of comments filed in this proceeding and have already consulted extensively with all of the relevant health and safety agencies. The RF guidelines we adopted were based on the recommendations of these agencies.

35. As noted previously, DOD, HP and the ARRL allege that we did not comply with provisions of the APA in adopting guidelines different than those originally proposed. However, we point out that our *Notice* incorporated a prominent discussion and request for comment on whether we should adopt alternative guidelines from those that were the principal focus of our proposal.[25] This discussion specifically mentioned the MPE limits recommended by the NCRP which, along with ANSI/IEEE C95.1-1992, formed the basis for the limits we adopted in the *Report and Order*. Similarly, we indicated in the *Notice* that our categorical exclusions, such as previously applied to all amateur radio stations, would be reviewed in

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[23] *See Report and Order* at Note 16.

[24] *See Report and Order* at para. 32.

[25] *See Notice of Proposed Rule Making* at paras. 23-25.

light of the new guidelines.[26] We believe that the final rules that were adopted were a "logical outgrowth" of that proposed in the *Notice*. *See American Water Works Ass'n. v. EPA*, 40 F. 3d 1266, 1274 (D.C. Cir. 1994). The Courts have generally ruled that "[A] final rule may properly differ from a proposed rule ... when the record evidence warrants the change." *See United Steelworkers of America v. Marshall*, 647 F.2d 1189, 1221 (D.C. Cir.), *cert. denied*, 453 U.S. 913 (1980). A final rule is not a logical outgrowth of a proposed rule generally "when the changes are so major that the original notice did not adequately frame the subject for discussion." *Connecticut Light and Power Co. v. Nuclear Regulatory Commission*, 673 F.2d 525, 533 (D.C. Cir.), *cert. denied*, 459 U.S. 835 (1982). Given that the *Notice* raised the issues of whether an alternative guideline such as that recommended by NCRP should be adopted and whether the categorical exclusions should be changed, as well as the substantial discussion of the issues in the comments in this proceeding, we conclude that the notice and comment provisions of the APA were followed and that a further Notice on these issues is unnecessary.

36. Regarding the DOD's assertion that our rules will hinder its ability to comply with provisions of the NTTAA, we believe that the process we followed in this proceeding is consistent with the requirements of the NTTAA. Section 12(d)(1) requires that all federal agencies and departments "shall use technical standards that are developed or adopted by voluntary consensus standards bodies ... as a means to carry out policy objectives or activities ... ." Section 12 (d)(3) indicates, however, that federal agencies may elect to use technical standards that are not developed or adopted by voluntary consensus standards bodies if: 1) it would be "inconsistent with applicable law or otherwise impractical"; and 2) the head of the agency transmits to the Office of Management and Budget (OMB) an explanation of the reasons for adopting a different standard. In this case, we proposed to adopt ANSI/IEEE C95.1-1992, which is quite clearly a voluntary consensus standard. However, as explained previously, comments were filed by federal health and safety agencies in this proceeding indicating that they were concerned about the safety ramifications of adopting certain aspects of the ANSI/IEEE C95.1-1992 standard. Therefore, based on these comments, we have concluded that adoption of ANSI/IEEE C95.1-1992 in its entirety would be problematic, and, therefore, would constitute an "impractical" action under the above-noted provision of the NTTAA, since it would not satisfy public safety concerns raised by these expert federal safety and health agencies. We have filed our decision in this proceeding with OMB based on existing guidance, as is done for all relevant rule making decisions. We understand that OMB is revising its Circular A-119 on "Federal Participation in the Development and Use of Voluntary Standards" in order to reflect the new NTTAA requirements. Once that revised Circular is issued, we will take whatever additional actions may be required to report our decision to OMB.

37. With regard to DOD's claim that our proposal was not properly coordinated with other agencies, we note that our proposal was coordinated with the federal agencies with

[26] *See Notice of Proposed Rule Making* at 19.

health and safety responsibilities. These agencies include the EPA, the FDA, the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). Each of these agencies sent letters to the FCC supporting our action.[27] While this action was not coordinated separately with DOD, it was coordinated with the Interdepartment Radio Advisory Committee (IRAC) and, based on that coordination, DOD filed further comments in the proceeding. These comments, along with the others we received, were considered in making our decision.

38. The DOD suggests that we should adopt ANSI/IEEE C95.1-1992 because it is "an internationally accepted consensus standard." We recognize that NATO has adopted a standard based on ANSI/IEEE C95.1-1992. However, we also note that all international standards are not identical to ANSI/IEEE C95.1-1992. For example, the recently drafted standard of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) incorporates limits for exposure in terms of specific absorption rate (applicable to hand-held devices such as cellular telephones) that are different than those contained in the ANSI/IEEE standard.[28] While we support the goal for having an internationally-accepted standard dealing with the environmental effects of RF electromagnetic fields, we believe that such a standard must adequately address the concerns raised by the relevant U.S. health and safety agencies.

39. In summary, in considering the arguments raised with respect to the RF exposure limits adopted in the *Report and Order*, we place special emphasis on the recommendations and comments of federal health and safety agencies because of their expertise and responsibilities with regard to health and safety matters. In the *Report and Order*, we adopted RF exposure limits that addressed specific safety concerns raised by these agencies about the limits we had originally proposed to adopt. We do not believe that the petitioners and commenters have provided reasonable alternatives that similarly would adequately address these safety concerns. Accordingly, we conclude that the RF exposure limits adopted in the *Report and Order* are appropriate because they address those concerns and, at the same time, allow applicants and licensees to meet the growing marketplace demand for communications services.

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[27] *See* letters to Reed E. Hundt, Chairman, FCC, from Carol M. Browner, Administrator, U.S. Environmental Protection Agency (EPA), dated July 25, 1996, and from Mary D. Nichols, Assistant Administrator for Air and Radiation, EPA, dated January 17, 1997. *See also*, letters to Richard M. Smith, Chief, FCC Office of Engineering and Technology, from Elizabeth D. Jacobson, Ph.D., Deputy Director for Science, Center for Devices and Radiological Health, Food and Drug Administration (FDA), dated July 17, 1996, from Paul A. Schulte, Ph.D., Director, Education and Information Division, National Institute for Occupational Safety and Health (NIOSH), dated July 25, 1996, and from Gregory J. Baxter, Acting Director, Directorate of Technical Support, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, dated August 2, 1996.

[28] ICNIRP Statement: "Health Issues Related to the Use of Hand-Held Radiotelephones and Base Transmitters." published in Health Physics, vol. 70, p. 587 (April 1996).

2. Categorical Exclusions

40. Our rules identify particular categories of existing and proposed transmitting facilities for which licensees and applicants are required to conduct an initial, routine environmental evaluation to determine whether these transmitting facilities comply with our RF guidelines.[29] *See* 47 CFR § 1.1307(b)(1). Our rules also identify certain types of mobile and portable transmitting devices that are subject to routine environmental evaluation prior to equipment authorization. *See* 47 CFR §§ 2.1091(c) and 2.1093(c). As for transmitting facilities and devices not specifically identified under 47 CFR §§ 1.1307(b)(1), 2.1091(c) or 2.1093(c), we have determined, based on calculations, measurement data, and other information, that such transmitting facilities offer little potential for causing exposure in excess of the applicable guidelines, and thus have "categorically excluded" those transmitters from the initial, routine environmental evaluation requirement.[30]

41. In the *Report and Order*, we revised our RF exposure rules to require routine evaluation of certain transmitting facilities that were previously categorically excluded from performing routine evaluation. These revisions were based on our own calculations and analyses of the implications of the new limits, along with information and data acquired in the record of this proceeding and from other sources. We attempted to bring consistency to the categorical exclusions, by adopting power, antenna height, and transmitter site criteria that would apply across similar services.

42. In their petitions and comments, AirTouch Communications, Paging Network, Inc. (PageNet), Arch Communications Group, Inc. (Arch) and PageMart II, Inc. (PageMart) urge us to reconsider our revised policy on categorical exclusion and reinstate the previous

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[29] If a routine evaluation is required, and if it is subsequently determined that the transmitting facility cannot be brought into compliance, the applicant or licensee is then required to submit to us a narrative statement known as an Environmental Assessment (EA). An EA describes why the transmitter or facility will not comply with the guidelines, and includes other pertinent information as is specified in our environmental rules. *See* 47 CFR § 1.1311. An EA would be considered in determining whether an application should be approved in view of the environmental impact or whether Environmental Impact Statements (EISs) should be prepared as specified in 47 CFR § 1.1314. However, EAs are rarely filed since most applicants and licensees who are not categorically excluded undertake measures to ensure compliance before submitting an application.

[30] Categorical exclusions from routine environmental evaluation are allowed under NEPA when actions are judged individually and cumulatively to have no significant potential for effect on the human environment. *See* 47 CFR § 1.1306(a); *see also, Notice* at para. 5, ET Docket No. 93-62, 8 FCC Rcd 2849 (1993). However, we retain, under § 1.1307(c) and (d), the authority to request that a licensee or an applicant conduct an environmental evaluation and, if appropriate, file environmental information pertaining to an otherwise categorically excluded application if it is determined that in that particular case there is a possibility for significant environmental impact.

exclusions for paging and cellular transmitters.[31] U S WEST also urges us to reinstate the previous exclusion for low-powered mobile and portable transmitting devices operating at or under 7 watts of transmit power.[32] AirTouch states that our decision ignores evidence in the record demonstrating that existing facilities in these services are unlikely to exceed the new MPE limits. AirTouch maintains that removal of the categorical exclusion for paging transmitters is not necessary and will subject the paging industry, "which operates on a very low revenue-per-unit basis," to substantial additional costs as well as burdensome reporting requirements. Ameritech argues that the *Report and Order* does not make it clear why industry studies supporting a continued exclusion were not persuasive. Because of the potential burden imposed on industry by removing the categorical exclusions for certain transmitting facilities, Ameritech proposes that an industry task force be allowed to further study relevant data and determine whether the exclusion policy can be "narrowed rather than eliminated altogether."[33] U S WEST maintains that removal of the categorical exclusion for low-powered devices has no scientific basis.

43. HP asks that we reconsider our decision not to provide a categorical exclusion for certain unlicensed millimeter-wave devices.[34] HP notes that 47 CFR § 2.1091(c) requires routine evaluation for all unlicensed mobile millimeter-wave technologies without regard to power yet at the same time generally excludes mobile devices in other services from routine environmental evaluation if they operate with less than 1.5 watts ERP, even though these devices are subject to more stringent MPE limits than millimeter-wave technologies. HP states that low-power categorical exclusions should be applied consistently to all transmitters and services, and suggests that this would lead to a categorical exclusion for mobile millimeter-wave devices having an ERP below 3 watts. HP suggests that, rather than specify the categorical exclusions based on ERP, we should categorically exclude low-power mobile devices, as well as unlicensed PCS and millimeter wave devices that don't meet the definition

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[31] AirTouch Petition at 3-4, PageNet Petition at 1-3, Arch Comments at 1, PageMart Reply at 3. PageNet and the Personal Communications Industry Association (PCIA) raised concerns that our *Report and Order* underestimated the number of paging transmitters that will require a determination of compliance and the burden on communications carriers. These concerns were addressed in the Final Regulatory Flexibility Analysis associated with the *First Memorandum Opinion and Order.*

[32] U S WEST Petition at 8. Under the 1982 ANSI guidelines, which were previously referenced in our rules, low power devices with 7 watts or less power were excluded from compliance with MPE limits. In the *Report and Order*, we required routine environmental evaluation of: 1) mobile transmitting devices (designed to be used with a separation distance of at least 20 centimeters between the radiating antennas and the body of the user or nearby persons) which operate with 1.5 watts effective radiated power (ERP) or more in the cellular, PCS, satellite, maritime and SMR services; 2) unlicensed PCS and unlicensed millimeter wave devices regardless of power; and 3) portable transmitting devices (designed to be used within 20 centimeters of the body of the user) operating in the cellular, PCS, satellite, maritime and SMR service regardless of power. *See* 47 CFR §§ 2.1091(c) and 2.1093(c).

[33] Ameritech Petition at 9.

[34] HP Petition at 1-6.

of portable devices, based on whether their RF electromagnetic fields exceed the MPE limits at a distance of 20 centimeters from the radiating antenna.[35] HP also requests that unlicensed millimeter-wave technologies be removed from Table 1 of 47 CFR § 1.1307(b) because Table 1 applies principally to fixed devices operating at power levels far in excess of those used by unlicensed millimeter-wave devices.

44. The Cellular Taskforce and the Ad-hoc Association oppose reinstating categorical exclusions for rooftop paging facilities.[36] The Ad-hoc Association maintains that, in some cases, even though a transmitting antenna is more than 10 meters above ground, there may be nearby buildings where exposure may be in excess of the FCC limits. In addition, the Ad-hoc Association proposes modifications to our rules on categorical exclusion, maintaining that we should use the "height of lowest transmitter" instead of height to center of radiation to determine whether evaluation is needed.[37] The Ad-hoc Association also proposes that a new rule be adopted requiring that an applicant demonstrate compliance, and provide informational material to residents, schools and hospitals, in each area within 1000 meters of their transmitting facility. Similarly, the Cellular Taskforce urges that the rules be modified to require routine environmental evaluation of all transmitters, facilities and operations that are less than 2000 feet from any residence.[38] The proposals from the Cellular Taskforce and the Ad-hoc Association are opposed as unnecessary and overly burdensome in comments filed by Ameritech and AirTouch.[39]

45. Decision. After considering the arguments raised by the petitioners, we generally are maintaining the categorical exclusions adopted in the *Report and Order*, except with respect to modifying Table 1 of Section 1.1310 regarding unlicensed PCS and millimeter wave devices, and categorical exclusions based on the height of the antenna "radiation center" above ground level, as discussed below (and with respect to amateur radio stations, as discussed later). We continue to believe that it is desirable and appropriate to categorically

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[35] Mobile devices are defined in our RF exposure rules as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between radiating antennas and the body of the user or nearby persons. *See* 47 CFR § 2.1091(b). Portable devices are defined as transmitters designed to be used within 20 centimeters of the body of the user. *See* 47 CFR § 2.1093(b).

[36] Cellular Taskforce Opposition at 2, Ad-hoc Association Ex Parte Comments at 1.

[37] Ad-hoc Association Petition at 5-7. In the *Report and Order*, we required routine evaluation of non-rooftop antennas used for Part 21 Multipoint Distribution Service (MDS), Part 22 Paging and Radiotelephone Service, Part 22 Cellular Radiotelephone Service, Part 24 Personal Communications Services (PCS), Part 74 Instructional Television Fixed Service (ITFS), Part 90 paging, and Part 90 "covered" Specialized Mobile Radio (SMR) stations when the radiation center was less than 10 meters above ground and the power was greater than 1000 watts ERP. *See* 47 CFR § 1.1307(b)(1).

[38] Cellular Taskforce Petition at 2.

[39] Ameritech Comments at 4-5, AirTouch Reply at 2.

exclude from routine evaluation only those transmitting facilities that we have reason to believe offer little or no potential for exposure in excess of our limits. We believe that our revised categorical exclusions meet this objective.

46. As stated previously, the categorical exclusions we adopted in the *Report and Order* for paging, cellular, and other high-powered transmitting facilities were based on our own calculations and analyses of the implications of the new limits, along with information and data acquired in the record of this proceeding and from other sources. Similarly, the low-power device exclusions were based on calculations and analyses that were discussed in detail in the *Report and Order*.[40] These calculations and analyses indicate that some transmitting facilities offer the potential for causing exposures in excess of our MPE and SAR limits because of such factors as their operating power, antenna location or relative accessibility. Nothing in the petitions provides new information to indicate that these calculations or analyses are incorrect, or that our categorical exclusions are not based on the best information currently available. As discussed in the *Report and Order*, based on technical evidence coming to light since we adopted the 1982 ANSI guidelines, it is clear that there can be situations involving paging, cellular and other higher powered transmitting facilities where the potential exists for significant environmental impact due to RF electromagnetic fields. Accordingly, NEPA requires that we consider the impact on the environment before we grant an application involving these stations. Based on this information and analysis, we cannot continue the blanket categorical exclusion for paging and other services, as advocated by some petitioners.

47. In general, we find no merit in the proposals of the Ad-hoc Association and the Cellular Taskforce to narrow our categorical exclusion rules, so that more transmitting facilities are subject to routine environmental evaluation, and to require applicants to provide informational material to nearby residents, schools, and hospitals. Our calculations and analyses indicate that those transmitting facilities that are categorically excluded from routine evaluation should offer little or no potential for exposure in excess of our limits. Furthermore, 47 CFR §§ 1.1307(c) and 1.1307(d) provide us with the ability to address any questions that might arise about specific, unique situations involving categorically excluded transmitting facilities.[41] However, we recognize the legitimate concerns raised by the Ad-hoc Association regarding our existing categorical exclusions that are based on the height of the

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[40] *See Report and Order* at paras. 62-74.

[41] 47 CFR § 1.1307(c) indicates that an interested person who believes that a particular action, otherwise categorically excluded, will have a significant environmental effect may submit a petition setting forth the reasons justifying, or circumstances necessitating, environmental evaluation. The Commission's Bureau responsible for processing the action will review the petition, consider the environmental concerns that were raised, and, if appropriate, require the applicant to prepare an EA. 47 CFR § 1.1307(d) indicates that the Commission's Bureau responsible for processing a particular action, otherwise categorically excluded, may, on its own motion, require an applicant to submit an EA if the Bureau determines that the proposal may have a significant environmental impact.

antenna "radiation center" above ground level.[42] As pointed out by the Ad-hoc Association, in some circumstances multiple antennas may be used on the same tower by the same transmitting facility and, even though the radiation center might be more than 10 meters above ground, the lowest antenna could be near enough to ground to cause excessive RF electromagnetic fields. While we do not think such situations are very common today in the services for which we based our categorical exclusion on height to the antenna radiation center, this may not always be the case in the future. Accordingly, we are amending the categorical exclusions that are currently based on the height of the antenna radiation center above ground so that they will be based, instead, on the height of the lowest point of the antenna above ground. We believe that this should pose little additional burden on our applicants and licensees while avoiding the potential for exposure to excessive RF electromagnetic fields.

48. As Ameritech points out, it may be possible to refine these categorical exclusions, based on additional relevant data that may be gathered over time, in order to better delineate between situations that should be subject to routine evaluation and those that should not. Along this line, we encourage interested parties to develop data and submit proposals, in the form of petitions for rule making, as they gain experience in doing routine environmental evaluations.

49. We do not agree with HP's specific proposal to base the categorical exclusion for low-power mobile devices, as well as unlicensed PCS and unlicensed millimeter-wave devices that do not meet the definition of a portable device, on whether the electromagnetic field produced by the transmitter exceeds the MPE limit at a distance of 20 centimeters. Rather, we believe that we should continue to base these categorical exclusions on ERP, which generally can be determined more easily and more reliably. Furthermore, HP's proposal would essentially eliminate the categorical exclusion for these devices, since a determination of compliance at 20 cm is essentially what is required for a routine evaluation, and thus could impose an additional unnecessary burden for certain applicants. Even though we will continue to base our categorical exclusions in this case on ERP, HP and other parties can, of course, demonstrate compliance by showing that persons will not be exposed to RF electromagnetic fields in excess of our guidelines.[43]

50. We do agree, however, with HP's argument that we should apply our categorical exclusions consistently to low-power devices. Our original power exclusion threshold of

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[42] As indicated in 47 CFR § 1.1307(b)(1), the antenna height provision applies to certain non-rooftop antennas used in the Multipoint Distribution, Paging and Radiotelephone, Cellular Radiotelephone, Personal Communications, Instructional Television Fixed, Private Land Mobile Paging, and Private Land Mobile Services.

[43] If a mobile device is found to comply with our MPE limits at a distance of 20 cm from the radiating antennas, then there generally would be no need to control access around the mobile device provided the applicant can justify that the device would be used in such a way that a separation distance of at least 20 cm is normally maintained between the radiating antennas and the body of the user or nearby persons.

1.5 watts ERP was based on calculations of the approximate power level at which a device, such as a mobile cellular phone operating on frequencies around 800-900 MHz, would be expected to exceed the applicable MPE power density limit of about 0.5 mW/cm^2 at a distance of 20 cm from the radiating antenna. For higher frequencies, above 1.5 GHz, the MPE limit for power density is less restrictive (1.0 mW/cm^2), and, therefore, a less restrictive power exclusion threshold can be justified. Using similar calculations, a power exclusion threshold of 3 watts ERP is appropriate for mobile devices operating above 1.5 GHz.

51. In response to HP's suggestion, we will require routine evaluation of unlicensed millimeter-wave mobile devices (that don't meet the definition of a portable device) only if the ERP is 3 watts or more.[44] Based on this same argument, we will require routine evaluation of all other mobile devices operating above 1.5 GHz (that don't meet the definition of a portable device), only if the ERP is 3 watts or more. For mobile devices operating at 1.5 GHz or below, the exclusion threshold will remain at 1.5 watts. We are also amending Table 1 of 47 CFR § 1.1307(b), as suggested by HP, to delete the provision for unlicensed PCS and millimeter wave devices recognizing that this might cause confusion, since Table 1 applies generally to fixed transmitters.

52. We appreciate the concerns raised by AirTouch and others that our new rules will pose new burdens for carriers. We have included several provisions in our RF guidelines that are intended to minimize this burden. For example, our categorical exclusion rules were designed to minimize the burden on carriers by instituting thresholds in terms of power and accessibility (e.g., rooftop vs. non-rooftop) that will result in routine evaluation only in situations where the potential for exposure in excess of our limits is significant. In addition, in many cases applicants are required by our operating bureaus only to file a statement demonstrating compliance.[45] Our rules allow, and we encourage, licensees at sites that have multiple transmitters to pool their resources and do a single environmental evaluation covering the entire location (when such an evaluation is required under our rules), thereby reducing the burden that would be incurred if each transmitter had to undertake similar evaluations. Finally, it should be recognized that, even if a transmitting source or facility is not categorically excluded from routine evaluation, no further environmental evaluation or processing is required once an applicant or licensee has determined that RF exposures in accessible areas near their transmitting facilities will be within our guidelines.

3. Amateur Radio Service (ARS)

53. Historically, all licensees and applicants in the ARS have been categorically excluded from performing routine environmental evaluations for compliance with our RF

[44] At these frequencies, some parties may find it more convenient to determine the equivalent isotropically radiated power (EIRP) than the ERP (ERP is referenced to a half-wave dipole).

[45] However, technical information showing the basis for the statement must be submitted upon request.

exposure guidelines. In the *Report and Order*, however, we concluded that there was a potential for amateur stations to cause RF exposure that would exceed our new limits. Accordingly, we decided to require amateur station licensees to: 1) conduct a routine environmental evaluation if they transmit using more than 50 watts; 2) take action to prevent human exposure to excessive RF electromagnetic fields if the routine environmental evaluation indicates that our limits could be exceeded; 3) demonstrate their knowledge of our guidelines through examinations; and 4) indicate in their applications for new licenses and renewals that they have read and understand our rules for limiting RF exposure.[46]

54. In its petition, the ARRL claims that the 50-watt threshold we adopted in the *Report and Order*, above which amateur radio operators must evaluate their stations, is arbitrary and inappropriate.[47] The ARRL points out that this threshold does not consider important factors, such as frequency, antenna height, antenna gain, emission mode, or duty cycle. The ARRL also notes that many other radio services, including some with higher duty cycles, are categorically excluded from performing routine evaluations even though they may operate with similar or higher power. The ARRL requests that the 50-watt threshold be modified to incorporate power levels contained in its petition, which vary by frequency, or else be increased to at least 150 watts transmitter power output if all parts of the antenna are located at least 10 meters from any area of uncontrolled exposure.

55. Alan Dixon, an amateur radio operator, maintains that it is burdensome and unnecessary for amateur radio operators to perform routine environmental evaluations and, when necessary, EAs.[48] Mr. Dixon states that the amateur radio community utilizes long-established customs of limiting duration of transmissions, using minimal power levels and establishing antenna installations which maximize propagation while inherently limiting unintended exposures. He believes that amateur operators should continue their traditional self-policing, free of "rigid overly-specific RF radiation parameters," given the "utter lack of evidence of detrimental effects thereby."

56. Decision. In the *Report and Order*, we noted that amateur stations can transmit with up to 1,500 watts peak envelope power on a wide range of frequency bands from 1,800 kHz to over 300 GHz. We also noted that amateur stations are not subject generally to restrictions on antenna gain, antenna placement, duty cycles, and other relevant exposure variables and, as a result, the possibility of human exposure to RF electromagnetic fields in excess of the guidelines could not be completely disregarded. Therefore, we came to the

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[46] *See Report and Order* at para. 160-163. As discussed previously, we also amended our rules to require the amateur radio operator license examination question pools to include questions concerning RF safety at amateur stations, requiring an additional five questions on RF safety within each of three written examination elements.

[47] ARRL Petition at 9-13.

[48] Alan Dixon Petition at 2-4.

conclusion that a categorical exclusion for all amateur stations is not justified. We continue to believe that is the case. However, we now conclude that a uniform 50-watt categorical exclusion threshold, as adopted in the *Report and Order*, would cause many amateur station licensees to perform unnecessary routine environmental evaluations.

57. The ARRL is correct that our MPE limits are frequency dependent. Because amateur stations are permitted to transmit in frequency bands covering a wide range of frequencies, the MPE limits that might apply to any particular amateur station operation can vary dramatically.[49] The ARRL argues, quite correctly, that by applying a single power threshold above which a routine environmental evaluation must be performed, the variations that occur in the RF exposure limit as the station transmitter frequency changes are disregarded. The ARRL proposes, in its petition, that we scale the power threshold to match the RF exposure limit. We believe that this proposal makes sense for frequency bands above 10 MHz. However, on frequency bands below 10 MHz, persons are more likely to be located in the "near-field" of the amateur station antenna, where the field strength can vary dramatically in a very short distance.[50] In addition, a simple scaling of the power threshold to match the RF exposure limit below 10 MHz would result in extremely high-powered operations being permitted without any routine environmental evaluation. We believe that a flat 500-watt power threshold below 10 MHz is necessary to ensure that these high-powered amateur stations do not cause human exposure to excessive RF electromagnetic fields. Accordingly, we are adopting the ARRL's proposal by specifying a transmitter power threshold for each individual ARS frequency band. As indicated in the table shown in 47 CFR § 97.13(c) of the revised rules, the power threshold for transmissions in the frequency bands below 10 MHz is 500 watts. We have also established this threshold for amateur repeater stations, which are normally located high above ground level and often at commercial sites, and we will base exclusions for these antennas on factors similar to those for paging and cellular antennas, as shown in the revised table, since their operation is similar. For frequency bands above 10 MHz, the power threshold varies from 50 watts to 450 watts. We believe the revised power thresholds for the ARS will eliminate burdensome and unnecessary requirements for most radio amateurs, and thus address the overall concerns raised by the ARRL and Mr. Dixon. These new thresholds, as well as some clarifying language we have added to 47 CFR § 97.13(c), also help protect the public from excessive exposure to RF electromagnetic fields produced by ARS stations by requiring that their licensees perform

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[49] For example, at 1,897 kHz (in the 160 meter amateur band) the MPE limit for general population/uncontrolled exposure is 50 mW/cm^2. At 29 MHz (in the 10 meter amateur band) the MPE limit for general population/uncontrolled exposure is about 0.2 mW/cm^2. The authorized frequency bands are contained in 47 CFR § 97.301.

[50] The near-field of an antenna generally extends out to a distance of $2L^2/\lambda$ from the antenna, where L is the effective length of the antenna and λ is the wavelength of the signal. For a typical amateur station using a half-wave dipole and operating on 10.125 MHz, the near-field would extend out to points approximately 15 meters from the antenna. As frequency decreases below 10 MHz, the size of the near-field increases (provided the effective length of the antenna is maintained). As frequency increases above 10 MHz, the size of the near-field decreases.

routine environmental evaluations and take appropriate actions if they operate their station in a manner that could cause human exposure to RF electromagnetic fields above that permitted under our guidelines.

4. Compliance at Multiple Transmitter Sites

58. In our *Report and Order*, we generally retained our policies regarding the environmental evaluation of RF electromagnetic fields at sites with multiple FCC-regulated transmitters.[51] Our existing rules state that, when the RF exposure limits are exceeded in an accessible area due to the RF electromagnetic fields produced by multiple fixed transmitters, actions necessary to bring the area into compliance are the shared responsibility of all licensees whose transmitters produce fields at the non-complying area in excess of 1% of the exposure limits applicable to their transmitter.[52] The rules also state that applicants for proposed (not otherwise excluded) transmitters, facilities, or modifications that would cause non-compliance with our limits at an accessible area previously in compliance are responsible for submitting an EA if the emissions from the applicant's transmitter or facility would result in a field strength or power density at the non-complying area in excess of 1% of the exposure limit applicable to that transmitter or facility.[53] In the case of renewal applicants, a similar requirement applies -- renewal applicants whose (not otherwise excluded) transmitters or facilities contribute field levels in excess of 1% of the applicable exposure limit at an accessible area must submit an EA if the area in question is not in compliance with the applicable RF guidelines.[54]

59. Several petitioners and commenters believe that the 1% level used as our threshold for determining responsibility at a non-complying area is too low. Arch, AT&T Wireless Services (AT&T), BellSouth Corporation (BellSouth), PageNet and PCIA all support raising this threshold from 1% to 10%.[55] However, this proposal is opposed by the Cellular

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[51] Prior to the effective date of the *Report and Order*, these policies were contained in Note 2 to 47 CFR § 1.1307(b). The *Report and Order* recodified these policies, essentially unchanged, into 47 CFR § 1.1307(b)(3), as amended.

[52] *See* 47 CFR § 1.1307(b)(3).

[53] *See* 47 CFR § 1.1307(b)(3)(i).

[54] *See* 47 CFR § 1.1307(b)(3)(ii).

[55] Arch Comments at 3, AT&T Petition at 6-8, AT&T Comments at 5, BellSouth Petition at 2, PageNet Petition at 5, PCIA Petition at 14-16.

Taskforce and others, who advocate increased regulation and scrutiny at multiple emitter sites.[56]

60. AT&T supports a higher threshold based on its view that a licensee's obligation to share responsibility for compliance at multiple-emitter sites should not be so easily triggered because of the time and expense involved in determining site-wide compliance. PageNet claims that a threshold of 10% or higher would meet our regulatory objectives while significantly minimizing unnecessary and burdensome obligations on licensees. PCIA says that a 1% threshold is too low given the "negligible" likelihood that a contributor of 1% of the limit would be responsible for non-compliance at a site. AT&T, BellSouth and U S WEST maintain that a 1% threshold could discourage co-location, while at the same time local governments are coming to recognize a valid public interest in requiring co-location of transmitters on common facilities or areas whenever feasible.[57] BellSouth also argues that the 1% threshold is impractical due to the lack of equipment capable of measuring power density levels with a margin of error of less than 1% and the likelihood that human error or environmental conditions could easily account for a 1% increase in power density on any given day. The Cellular Taskforce argues that a 10% trigger would potentially leave a great many areas effectively excluded from regulation -- if no facility in an area passed the 10% threshold, then that area could not be brought into compliance. The Cellular Taskforce submits that this is unlikely ever to happen with the existing 1% threshold.

61. Ameritech and AirTouch urge us to establish specific procedures for multiple transmitter situations.[58] For example, Ameritech wants clear direction on the following points: How is the impact from multiple-transmitter locations to be addressed? Will facilities which are categorically excluded still count toward an evaluation of cumulative exposure? How is responsibility for compliance to be "shared", as required by our rules? What procedures apply if one or more licensees refuse to cooperate? Do "in-building" transmitters require environmental evaluation, and should rooftop transmitters be considered in evaluating compliance of such transmitters?

62. AirTouch, BellSouth and PageMart maintain that a site owner, not a licensee, should be responsible for determining compliance with the RF guidelines at multiple-transmitter sites.[59] AirTouch maintains that a site owner is the only party with direct knowledge of all site occupants and their operational characteristics, and is, therefore, in the best position to calculate field levels and determine whether a site is in compliance.

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[56] Cellular Taskforce Reply at 6, Holly Fournier and Mary Beth Freeman Reply at 3, Alan Golden Reply at 2, Dawn Mason Reply at 2.

[57] AT&T Petition at 7-8, BellSouth Petition at 4, U S WEST Petition at 5-8.

[58] Ameritech Petition at 3-4, AirTouch Reply at 6-10.

[59] AirTouch Petition at 4-6 and Reply at 3, BellSouth Petition at 3, PageMart Reply at 2.